



AAAS Annual Meeting

12-16 February 2009
Hyatt Regency Chicago

Featuring science from the
U.S. Department of Energy's
Brookhaven National Laboratory

- Basic Research for Global Energy Security: A Call to Action
Friday, February 13, 2009 • 8:30–11:30 a.m. • HRC Grand F
- Quest for the Perfect Liquid: Connecting Heavy Ions,
String Theory and Cold Atoms
Sunday, February 15, 2009 • 10:30 a.m.–noon • HRC Regency C
- Casting New Light on Ancient Secrets
Monday, February 16, 2009 • 9:30 a.m.–12:30 p.m. • HRC Grand C North

Basic Research for Global Energy Security: A Call to Action

Friday, February 13, 2009, 8:30–11:30 a.m. • HRC Grand F

The United States consumes about 3.5 terawatts of energy on a continual basis — think 35 billion 100-watt light bulbs burning constantly, or the output of 3,500 coal-burning power plants. Right now, we derive the bulk of that energy from oil, gasoline, coal, and natural gas — nonrenewable fossil fuels that, when burned, add carbon to Earth's atmosphere. Levels of manmade carbon dioxide going into the atmosphere are currently at an all-time high, and demand for energy is only expected to grow — upwards of 50 percent for electricity alone by the year 2030. Basic research conducted at universities, in national labs, and in industry is leading to game-changing breakthroughs that transcend the limitations of current technologies and may enable completely new and vastly more efficient energy systems.

Scientists are also working to design and engineer technological improvements to optimize efficiency and performance across the energy spectrum to meet this crucial challenge. This symposium will bring together leaders in the field to present new findings on identifying and advancing renewable, sustainable sources of energy such as solar, wind, hydro, and biofuels/biomass. Speakers will discuss innovations in producing, converting, transmitting, storing, and using energy and explain how basic research — particularly in the emerging field of nanoscience — is enabling advances in catalysis, superconductivity, artificial photosynthesis, and other areas.

Organized by: James Misewich and Peter A. Genzer, Brookhaven National Laboratory, Upton, NY

Quest for the Perfect Liquid: Connecting Heavy Ions, String Theory, and Cold Atoms

Sunday, February 15, 2009, 10:30 a.m.—noon • HRC Regency C

Physicists built the Relativistic Heavy Ion Collider (RHIC), a particle accelerator at Brookhaven National Laboratory, to recreate a form of matter that last existed mere microseconds after the Big Bang. Their aim was to create and probe this predicted gaseous plasma of free quarks and gluons — the most basic constituents of matter — to better understand the forces that hold the universe and everything in it together. What they found was surprising, and much more interesting, attracting the attention of scientists and others outside their field. Instead of behaving like a gas of free quarks and gluons, the matter created at RHIC appears to be more like a liquid. In fact, it's the most "perfect" liquid ever observed, with virtually no viscosity, or resistance to flow. As it turns out, calculations of the perfect

liquid's viscosity can be derived using methods of string theory, linking RHIC with that theory's search for extra dimensions of space and time and theoretical black holes. RHIC experiments may even provide ways to test predictions of string theory, which to date has not been possible. In addition, RHIC's findings of what happens with hot, dense matter help in understanding ultra-cold matter and possibly even high-temperature superconductors and neutron stars. This symposium brings together experts from RHIC, string theory/cosmology, and atomic physics, as well as a science journalist to explore these connections and lead a discussion of the relevance of this research.

Organized by: Peter Steinberg, Brookhaven National Laboratory, Upton, NY; William A. Zajc, Columbia University, New York, NY

Casting New Light on Ancient Secrets

Monday, February 16, 2009, 9:30 a.m.—12:30 p.m. • HRC Grand C North

In many cases, our knowledge of the past has had to wait for technological advances to provide the tools required to learn more about the origins of life and ancient history. Today, the fascinating secrets of our ancient world are being uncovered with the assistance of state-of-the-art, nondestructive, x-ray techniques. This symposium presents an insight into the capabilities of the many light source research facilities located around the world in relation to archaeology, palaeontology, and anthropology. Samples that are being studied are wide-ranging and include fossil primates and hominids, Peruvian mummy teeth dating from the early 1500s, *T. rex* dinosaur remains, fragments of the Dead Sea Scrolls, priceless irreplaceable works of art, and 10th century parchment never seen before in modern times. In the case of parchment, not only can the experiments help with the conservation of the documents, they can also reveal text that, until now, has been hidden from modern society. Anthropologists are interested in what ancient people ate, and

archaeologists are on the hunt for the oldest collagen on the planet. International researchers will share their latest discoveries and explain their research aspirations for the future.

Organized by: Silvana Damerell and Isabelle Boscaro-Clarke, Diamond Light Source, Didcot, United Kingdom



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